Guidelines for Foundation Reviews

A Foundation Review is to be conducted by the design engineer on: 1) all bridge replacement or new bridge construction projects (including box culverts that are bridges), and 2) all 3-sided culverts (even those that technically are not bridges). Generally, it shall be submitted at the Preliminary Plans for Final Approval (PPFA) stage. However, it is feasible (but not desirable) to obtain Design Approval without the Foundation Review.

The following guidelines are provided to help designers conduct suitable foundation reviews.

1. Minimum pile tip elevations for scour for interior substructures shall be determined by the method outlined on the "Pile Tip Elevation Guidelines" flow chart.

2. For pile footings the minimum pile tip elevation shall be determined using the Q500 scour elevation.

3. Whenever the bottom of a pile footing is located above the Q100 scour elevation, the piling shall be designed for additional lateral restraint and column action for the unsupported pile length above Q100 scour elevation. A factor of safety of 2.0 shall be used. The piling shall also be checked for the same criteria using the Q500 scour elevation and a factor of safety of 1.0.

4. The minimum pile tip elevation for scour determined by the designer should not be confused with the estimated pile tip elevation theoretically needed to obtain the required bearing. The estimated pile tip elevation is found in the Geotechnical Report. The lower of these two pile tip elevations is used for determining the pay quantity.

5. Proposed top and bottom of footing elevations should be determined in accordance with the procedures noted on the "Pile Tip Elevation Guidelines" flow chart.

6. The mudsill (approximately 300 mm thick) of a wall pier that has a single row of piles can be considered as an open pile bent with a very deep cap; hence, the mudsill does not need to be placed below the scour elevation.

7. Design piers on floodplains as river piers. Locate their foundations at the appropriate depth if there is a likelihood that the stream channel will shift during the life of the structure or that channel cutoffs are likely to occur. For structures or portions of structures that qualify as overflow structures, consult the INDOT Hydraulics Unit.

Good engineering judgment should always be used in conjunction with the "Pile Tip Elevation Guidelines" flow chart when recommending pile tip and footing elevations.

Foundation Review

1. Designer (Consultant or in-house designer) receives Geotechnical Report.

2. At the Preliminary Plans for Final Approval (PPFA) stage the Designer proposes the foundation using the Foundation Review form:

   a. Spread footing
      (1) Type - On rock or soil
      (2) Size - N/A
      (3) Design load (Maximum allowable bearing pressure)
      (4) Ultimate load - N/A
      (5) Min. Pile Tip Elevation - N/A
      (6) Use Pile Tip - N/A
      (7) Bottom of footing elevation
      (8) Top of footing elevation

   b. Footing supported on piles or pile bent
      (1) Type (H pile or pile shell)
      (2) Size
      (3) Design load
      (4) Ultimate load
      (5) Minimum pile tip elevation
      (6) Use pile tip or not
      (7) Bottom of footing elevation
      (8) Top of footing elevation
      (9) In the "other" area of the form discuss down drag, if applicable; note other special information.
      (10) Attach "Pile Loads Table"

   c. Drilled shaft
      (1) Size
      (2) Design load

   d. Other

3. The Designer sends the form to the geotechnical engineer (consultant or Materials and Tests Division, depending on who wrote the Geotechnical Report) for the project.

4. If the Geotechnical Engineer approves, the Geotechnical Engineer signs, dates, and returns the form to the Designer. (If the Designer is a consultant, go to step 5; otherwise go to step 7). If the Geotechnical Engineer disagrees with the recommendations the marked up form is returned to the Designer for resubmission.

5. Consultant transmits request for foundation review (containing the information listed in number 2) to Project Coordinator. The Project Coordinator for INDOT projects is:

   Sally Chesney for routes 1-31
   Peggy Spears for routes 32-65
   Joan Staggs for routes 66-930

   For LPA projects the Project Coordinator is:

   Bruno Canzian – Greenfield & Fort Wayne District
   Bob Rhoades – Crawfordsville & LaPorte District
   Steve Dilk – Seymour & Vincennes District

6. Project Coordinator transmits request for foundation review to the Project Reviewer.

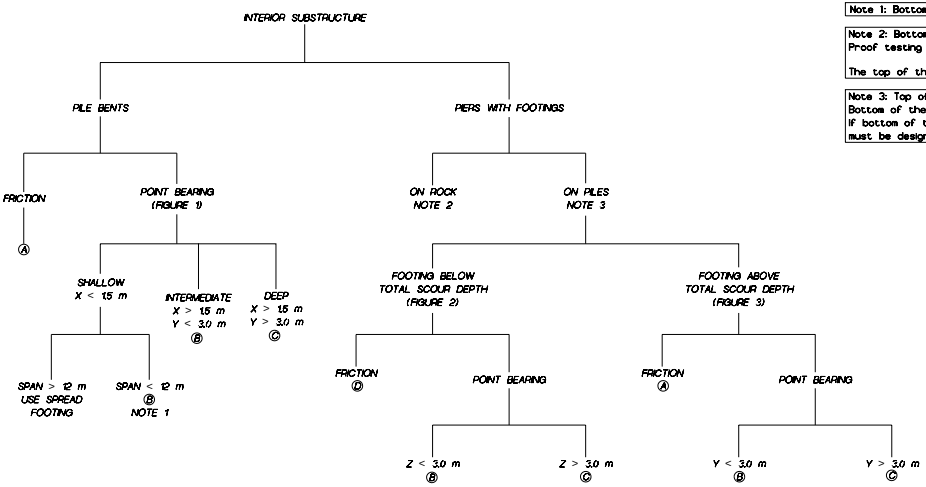
7. The Project Reviewer reviews the form and signs and dates the form if he/she concurs. The Project Reviewer then schedules a meeting with the appropriate INDOT Design Section Manager.

8. The Project Reviewer meets with the appropriate INDOT Design Section Manager to review the proposed foundation. The Project Reviewer is to bring the following information to the meeting:

   a. Geotechnical Report
   b. General Plan & Layout Sheets
   c. Scour Review memorandum

   If the Section Manager concurs with the recommendations, he/she signs and dates the form.

9. The Project Reviewer gives the completed Foundation Review form to the Project Coordinator. The Geotechnical Section is to receive a copy of all completed Foundation Review forms.



Note 1: Bottom of the pile to be 1.5 m below flowline.

Note 2: Bottom of the footing to be 0.6 m below scour resistant rock. Proof testing will be required if specified in geotechnical report

The top of the footing must be below the flowline.

Note 3: Top of the footing shall be below contraction scour for Q 100 Bottom of the footing shall be a minimum of 1.8 m below flowline. If bottom of the footing is above total scour depth, piles must be designed as columns.

LEGEND

Ⓐ Minimum Pile Tip elevation to be 3.0 m below total scour depth for Q 500

Ⓑ Minimum 0.9 m Core into scour resistant rock

Ⓒ Drive to ultimate bearing in rock

Ⓓ Minimum Pile Tip elevation to be 3.0 m below bottom of the footing

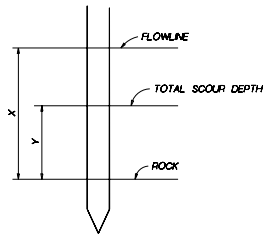


FIGURE 1

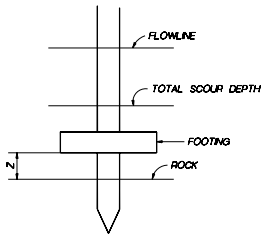


FIGURE 2

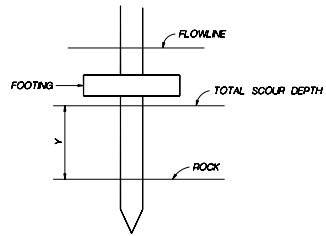


FIGURE 3

GENERAL NOTES

Cored hole in rock shall be backfilled with concrete.
For friction pile, skin friction obtained above total scour elevation shall be neglected.

PILE TIP ELEVATION GUIDELINES
(For Bodies of Water)
Figure 66-3B

DESIGN 3,GDS,GDS,PILETIP.FGB